

## The caBIG<sup>®</sup> Adapt Path: Resources and Support

Many cancer research organizations already have software tools and databases that are integrated into existing workflows and infrastructure, that exchange data, and that meet the needs of users. For these organizations, the best approach to connection with caBIG<sup>®</sup> may be to **adapt** their existing tools to be caBIG<sup>®</sup>-compatible, so that they can interoperate with other tools – both within their organization, and with others. Adapting a tool to be interoperable with other tools allows researchers to:

- More easily connect interoperable tools and integrate data across research areas (e.g., clinical systems, biospecimens management, bench science analytical tools)
- Access and share analytical tools and services across other organizations
- Share data securely as appropriate for research projects, and to meet data sharing goals.

For those seeking a path towards caBIG<sup>®</sup> compliance, adapting your existing tool to enable interoperability and data sharing is a valid route to that goal.

### Resources for the Adapt Path

To effectively implement an adaptation effort, you will need access to both technical and domain teams in your organization. The technical team may include a mix of application developers, data modelers, and database administrators. The domain team should include subject matter experts directly involved in the use of the tool being adapted.

The caBIG<sup>®</sup> program provides a number of resources and tools to support your adaptation effort. This section provides an overview of and links to these resources.

- [Understanding the Adopt-Adapt Decision](#): This is an **overview presentation** for those just learning about caBIG<sup>®</sup> tools adoption and the adaptation path. It is a good introduction for those new to these two paths, or who need more information about the benefits and trade-offs of these choices.
- [Adaptation Roadmap](#): This presentation provides a number of **design patterns**, or foundational architectural strategies, for adapting a tool. These patterns vary depending on the scope of the tool you wish to adapt and the data ultimately to be shared; the staffing you have; and the technology environment within which you are working. A number of examples show how the design patterns have been applied at specific cancer centers.
- [Adaptation Use Cases](#): This document provides a quick glance overview and comparison of real-life caBIG<sup>®</sup> adaptation **case studies**, so people considering this path can more easily find information about projects similar to their own. A summary table includes a summary of each project's goals, the approach taken, the resources and expertise needed, the outcomes, and tips for others.

Once an approach is selected, the following **open source repositories and tools**, provided by the National Cancer Institute (NCI) will be helpful in supporting the adaptation process. Some of these tools

are development tools (designed to help you build or adapt a system); others are tools that support the integration of information between existing tools.

### Tools to Support the Adaptation Process

Tool	Description
<a href="#">Enterprise Vocabulary Services (EVS)</a>	Controlled standard vocabularies are needed to provide shared meaning to data across tools. If we both use the same controlled vocabulary, the terms in my system will match those in yours – much of the adaptation process focuses on establishing this “semantic interoperability.” The Enterprise Vocabulary Services provide access to a number of standard vocabulary tools and resources used by caBIG <sup>®</sup> .
<a href="#">Cancer Data Standards Repository (caDSR)</a>	The caDSR is a searchable database and a set of tools for identifying common data elements (CDEs) and registered data models that may be useful for an adaptation effort. Common Data Elements (CDE) utilize terms from the controlled vocabularies but provide additional information (metadata) about how the data are represented in a particular model. CDEs and registered UML Models are vital for information model reuse, which can save development time.
<a href="#">caBIG<sup>®</sup> Integration Hub</a> (formally caXchange)	Designed to support clinical trials workflow integration, the caBIG <sup>®</sup> Integration Hub provides a hub to enable interoperable tools to interface with one another. This software supports integrated clinical trials workflows and offers users the flexible interoperability associated with a service oriented architecture (SOA). The caBIG <sup>®</sup> Integration Hub facilitates the ability of organizations to integrate caBIG <sup>®</sup> Clinical Trial applications with their existing applications, allowing a hybrid approach to the adopt and adapt paths.
<a href="#">caAdapter</a>	caAdapter is an open source tool set that provides model mapping services, and facilitates data mapping and transformation among different kinds of data sources. caAdapter has a component-based architecture to support message development and reporting using standard data formats. It provides Webstart versions, APIs that can be integrated easily with other applications such as the caBIG <sup>®</sup> Integration Hub, and a web service that exposes caAdapter functions for integration with other caGrid applications. caAdapter is part of the larger set of tools that make up “caCORE” (Cancer Common Ontologic Representation Environment). <a href="#">Learn more about caCORE</a> .
<a href="#">caIntegrator2</a>	caIntegrator2 is a web-based software package that allows users to set up custom, caBIG <sup>®</sup> -compatible web portals to conduct integrative research, without extensive programming experience. Using caIntegrator2, researchers can execute, save and share queries to identify and collect many types of data into a consolidated warehouse, combining clinical information with genetic and genomic data to enable multidimensional analysis.

[caCORE Software  
Development Kit \(SDK\)](#)

A model-driven software engineering tool for creating interoperable (caBIG<sup>®</sup> compatible) systems which can then be integrated with caGrid. The caCORE SDK includes the Introduce toolkit, which facilitates connecting a caBIG<sup>®</sup> compatible application to caGrid.

## Support Options

In addition to the resources and tools above, the following support resources may be useful as you pursue the adapt path:

- If you are with an NCI Cancer Center, you may already have a caBIG<sup>®</sup> Deployment Lead at your institution that can help connect you with others with similar interests. Write to [caBIGconnect@cancer.gov](mailto:caBIGconnect@cancer.gov) to find locate that point of contact to support internal networking.
- [caCORE Training Program](#): This program is designed for developers that will be working with NCI tools to develop or adapt tools to be caBIG<sup>®</sup> compatible.
- [caBIG<sup>®</sup> Vocabulary Knowledge Center](#): Led by the Mayo Clinic, this center of expertise focuses on the vocabulary tools needed to ensure semantic interoperability.
- [caGrid Knowledge Center](#): Led by Ohio State, this center of expertise focuses on assisting developers in preparing their adapted tools for connection on the Grid.
- [Data Sharing Knowledge Center](#): One benefit of adapting a tool is the subsequent ability to share data between interoperable tools. Led by the University of Michigan, this center of expertise will help you navigate the legal and regulatory dimensions of data sharing.
- [caBIG<sup>®</sup> Support Service Providers](#): SSPs are independent organizations that can provide client-specific caBIG<sup>®</sup> support for an adaptation effort. Such an adaptation effort would be completed under negotiated client-provider business arrangements.

This overview sheet was created by the caBIG<sup>®</sup> Documentation and Training Workspace. Visit the [caBIG<sup>®</sup> Training Portal](#) for additional educational resources.